# TRANSMISSION LINE SAFETY AND NUISANCE

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## INTRODUCTION

The electrical energy from the proposed East Altamont Energy Center (EAEC), if approved, will be available for delivery to the area's 230- kilovolt (kV) electric grid consisting of transmission lines owned by Pacific Gas and Electric (PG&E), the Western Area Power Administration (Western), the Modesto Irrigation District (MID), and the Turlock Irrigation District (TID). According to information from the applicant – Calpine, doing business as East Altamont Energy Center, LLC – this delivery will be made through a new on-site EAEC Switchyard to be owned by Western that would be connected via two new double-circuit 230-kV transmission lines to an existing 230-kV transmission line that will be sectionalized to provide interconnections with Western's Tracy Substation and the Wesley Substation. Western's existing 230 kV Tracy Substation located across Mountain House Road immediately to the west of the project site (EAEC 2001a, pages 1-2, 2-6 and 5-1). The Tracy Substation, to which these area utility lines are currently connected, will (along with the new project-related addition) continue serving as a common distribution point for power from area sources.

As more fully discussed by the applicant (EAEC 2001a, page 5-14), connection from EAEC to the grid will be made by looping the existing 230 kV Tracy-Westley line (jointly owned by MID and TID) into the new EAEC Switchyard using two double-circuit 230- kV lines over the 0.5 mile distance involved. In additions, circuits breakers and controls will be added to the Tracy and Wesley substations. This interconnection scheme would allow the power from EAEC to be introduced into the grid through either the Tracy Substation or the Wesley Substation. The location for EAEC was chosen in part for its proximity to the Tracy Substation (EAEC 2001a, page 5-1). Line construction will be according to the standard designs of Western, which will assume ownership of the towers and new section of line from Tracy Substation to Tracy East (a new substation associated with EAEC). MID/TID will also follow Western standard designs and will own the new towers and new section of line from Tracy East to Westley Substation. Western designs and practices reflect compliance with existing health and safety laws, ordinances, regulations, and standards (LORS) regarding line safety and field strength reduction as will be discussed later.

Since line electric fields depend on the applied voltage and conductor configuration, and the same 230 kV would continue to be applied to existing area grid lines without changes in configuration, the electric fields along their respective routes would not be increased by the new power from EAEC. Only their magnetic fields would increase (since magnetic fields are the only fields whose intensities depend directly on current levels for a given design). The increase along each line route would depend on the demand-driven levels of the new EAEC energy transmitted along each transmission circuit.

The purpose of this staff analysis is to assess the proposed transmission line construction and operation plan for incorporation of the measures necessary to minimize the field and non-field impacts consistent with existing health and safety

LORS. Staff's analysis will focus on the following issues as related primarily to the physical presence of the lines or secondarily to the physical interactions of their electric and magnetic fields:

Aviation safety;

Interference with radio-frequency communication;

Audible noise;

Fire hazards;

Hazardous shocks;

Nuisance shocks; and

Electric and magnetic field (EMF) exposure.

## LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Discussed below by subject area are design-related LORS applicable to the physical impacts of the overhead transmission lines as proposed for EAEC. The potential for these impacts is assessed in terms of compliance with specific federal or state regulations or established industry standards and practices. There presently are no local laws or regulations specifically aimed at the physical structure or dimensions of electric power lines to limit the impacts noted above. However, many local jurisdictions require distribution lines to be located underground because of the potential for visual impacts on the landscape.

### AVIATION SAFETY

Any potential hazard to area aircraft would relate to the potential for collision in the navigable air space. The applicable federal LORS as discussed below are intended to ensure the distance and visibility necessary to prevent such collisions.

#### Federal

Title 14, Part 77 of the Code of Federal Regulations (CFR), "Objects Affecting the Navigation Space." Provisions of these regulations specify the criteria used by the Federal Aviation Administration (FAA) for determining whether a "Notice of Proposed Construction or Alteration" is required for potential obstruction hazards. The need for such a notice depends on factors related to the height of the structure, the slope of an imaginary surface from the end of nearby runways to the top of the structure, and the length of the runway involved. Such notification allows the FAA to ensure that the structure is located to avoid the aviation hazards of concern.

FAA Advisory Circular (AC) No. 70/460-2H, "Proposed Construction and or Alteration of Objects that May Affect the Navigation Space." This circular informs each proponent of a project that could pose an aviation hazard of the need to file the "Notice of Proposed Construction or Alteration" (Form 7640) with the FAA.

FAA AC No. 70/460-1G, "Obstruction Marking and Lighting." This circular describes the FAA standards for marking and lighting objects that may pose a navigation hazard as established using the criteria in Title 14, Part 77 of the CFR.

## INTERFERENCE WITH RADIO-FREQUENCY COMMUNICATION

Transmission line-related radio-frequency interference is one of the indirect effects of line operation as produced by the physical interactions of line electric fields. Since electric fields are unable to penetrate most materials, including the soil, such interference and other electric field effects are not associated with underground lines. The level of any such interference usually depends on the magnitude of the electric fields involved. Because of this, the potential for such impacts could be assessed from field strength estimates obtained for the line. The following regulations are intended to ensure that such lines are located away from areas of potential interference and that any interference is mitigated whenever it occurs.

### Federal

Federal Communications Commission (FCC) regulations in Title 47 CFR, Section 15.25. Provisions of these regulations prohibit operation of any devices producing force fields, which interfere with radio communications, even if (as with transmission lines) such devices are not intentionally designed to produce radio-frequency energy. Such interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as corona discharge but is referred to as spark gap electric discharge when it occurs within gaps between the conductor and insulators or metal fittings. When generated, such noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio communication. Since the level of interference depends on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The FCC requires each line operator to mitigate all complaints about interference on a case-specific basis. Staff recommends specific conditions of certification (**TLSN-3**) to ensure compliance with this FCC requirement.

### State

General Order 52 (GO-52), California Public Utilities Commission (CPUC). Provisions of this order govern the construction and operation of power and communications lines and specifically deal with measures to prevent or mitigate inductive interference. Such interference is produced by the electric field induced by the line in the antenna of a radio signal receiver.

Several design and maintenance options are available for minimizing these electric field-related impacts. When incorporated into the line design and operation, such measures also serve to reduce the line-related audible noise discussed below.

## AUDIBLE NOISE

### Industry Standards

There are no design-specific federal regulations to limit the audible noise from transmission lines. As with radio noise, such noise is limited instead through design, construction or maintenance practices established from industry research and

experience as effective without significant impacts on line safety, efficiency maintainability and reliability. All modern overhead high-voltage lines are designed to assure compliance. As with radio-frequency noise, such audible noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying or hissing sound or hum, especially in wet weather. Since the noise level depends on the strength of the line electric field, the potential for perception can be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during rainfall, but mainly from overhead lines of 345 kV or higher. It is, therefore, not generally expected at significant levels from those of less than 345 kV such as the ones proposed for EAEC. Research by the Electric Power Research Institute (EPRI 1982) has validated this by showing the fair-weather audible noise from modern transmission lines to be generally indistinguishable from background noise at the edge of a 100-ft right-of-way.

## NUISANCE SHOCKS

### Industry Standards

There are no design-specific federal regulations to limit nuisance shocks in the transmission line environment. For modern overhead high-voltage lines, such shocks are effectively minimized through grounding procedures specified in the National Electrical Safety Code (NESC) and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE). Nuisance shocks are caused by current flow at levels generally incapable of causing significant physiological harm. They result mostly from direct contact with metal objects electrically charged by fields from the energized line. Such electric charges are induced in different ways by the line electric and magnetic fields. As with the proposed overhead lines, the applicant in consultation with Western will be responsible in all cases for ensuring compliance with these grounding-related practices within the right-of-way. Staff recommends specific conditions of certification (**TLSN-2**) to ensure that such grounding is made along the route.

## FIRE HAZARDS

The fire hazards addressed through the following regulations are those that could be caused by sparks from conductors of overhead lines, or that could result from direct contact between the line and nearby trees and other combustible objects.

### State

General Order 95 (GO-95), CPUC, “Rules for Overhead Electric Line Construction” specifies tree-trimming criteria to minimize the potential for power line-related fires. Title 14 Section 1250 of the California Code of Regulations: “Fire Prevention Standards for Electric Utilities” specifies utility-related measures for fire prevention.

## HAZARDOUS SHOCKS

The hazardous shocks addressed by the following regulations and standards are those that could result from direct or indirect contact between an individual and the energized line whether overhead or underground. Such shocks are capable of serious

physiological harm or death and remain a driving force in the design and operation of transmission and other high-voltage lines.

## State

GO-95, CPUC. "Rules for Overhead Line Construction". These rules specify uniform statewide requirements for overhead line construction regarding ground clearance, grounding, maintenance and inspection. Implementing these requirements ensures the safety of the general public and line workers.

Title 8, California Code of Regulations, section 2700 et seq., Sections 2700 through 2974. "High Voltage Electric Safety Orders". These safety orders establish essential requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment

## Local

There are no shock hazard-related requirements on the physical dimensions of power lines at the local level.

## Industrial Standards

No design-specific federal regulations have been established to prevent hazardous shocks from overhead power lines. Safety is assured within the industry from compliance with the requirements in the National Electrical Safety Code, Part 2: Safety Rules for Overhead Lines. These provisions specify the minimum national safe operating clearances applicable in areas where the line might be accessible to the public. They are intended to minimize the potential for direct or indirect contact with the energized line.

# ELECTRIC AND MAGNETIC FIELD (EMF) EXPOSURE

The possibility of deleterious health effects from electric and magnetic field exposure has increased public concern in recent years about living near high-voltage lines. Both fields occur together whenever electricity flows, hence the general practice of describing exposure to them together as EMF exposure. The available evidence as evaluated by CPUC, other regulatory agencies, and staff, has not established that such fields pose a significant health hazard to exposed humans. However, staff considers it important, as does the CPUC, to note that while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard. Staff, therefore considers it appropriate in light of present uncertainty, to recommend reduction of such fields as feasible without affecting safety, efficiency, reliability and maintainability.

While there is considerable uncertainty about the EMF/health effects issue, the following facts have been established from the available information and have been used to establish existing policies:

Any exposure-related health risk to the exposed individual will likely be small.

The most biologically significant types of exposures have not been established.

Most health concerns are about the magnetic field.

The measures employed for such field reduction can affect line safety, reliability, efficiency and maintainability, depending on the type and extent of such measures.

## State

In California, the CPUC (which regulates the installation and operation of high-voltage lines in California) has determined that only no-cost or low-cost measures are presently justified in any effort to reduce power line fields beyond levels existing before the present health concern arose. The CPUC has further determined that such reduction should be made only in connection with new or modified lines. It required each utility within its jurisdiction to establish EMF-reducing measures and incorporate such measures into the designs for all new or upgraded power lines and related facilities within their respective service areas. The CPUC further established specific limits on the resources to be used in each case for field reduction. Such limitations were intended by the CPUC to apply to the cost of any redesign to reduce field strength or relocation to reduce exposure. Utilities not within the jurisdiction of the CPUC voluntarily comply with these CPUC requirements. This CPUC policy resulted from assessments made to implement CPUC Decision 93-11-013 of 1993.

In keeping with this CPUC policy, staff requires evidence that each proposed overhead line will be designed according to the EMF-reducing design guidelines applicable to the utility service area involved. These field-reducing measures can impact line operation if applied without appropriate regard for environmental and other local issues bearing on safety, reliability efficiency and maintainability. Therefore, it is up to each applicant to ensure that such measures are applied to avoid significant impacts on line operation and safety. The extent of such applications would be reflected by the ground-level field strengths as measured during operation. When estimated or measured for lines of similar voltage and current-carrying capacity, such field strength values can be used by staff and other regulatory agencies to assess each lines for effectiveness at field strength reduction. These field strengths can be estimated for any given design using established procedures. Estimates are specified for a height of one meter above the ground, in units of kilovolts per meter (kV/m), for the electric field, and milligauss (mG) for the companion magnetic field. Their magnitude depends on line voltage (in the case of electric fields), the geometry of the structures, degree of cancellation from nearby conductors, distance between conductors and, in the case of magnetic fields, amount of current in the line.

Since each new line in California is currently required to be designed according to the EMF-reducing guidelines of the utility in the service area involved, its fields are required under existing CPUC policies to be similar to fields from similar lines in that service area. As a Federal entity, Western transmission lines do not come under CPUC jurisdiction, however, Western lines are designed in accordance with EMF reducing guidelines. A condition of certification is usually proposed by staff to ensure implementation of the design measures necessary. The applicable condition for this project is **TLSN-1**.

## Industrial Standards

There are no health-based federal regulations or industry codes specifying environmental limits on the strengths of fields from power lines. However, the federal

government continues to conduct and encourage research necessary for an appropriate policy on the EMF health issue.

In the face of the present uncertainty, several states have opted for design-driven regulations ensuring that fields from new lines are generally similar to those from existing lines. Some states (Florida, Minnesota, New Jersey, New York, Montana) have set specific environmental limits on one or both fields in this regard. These limits are, however, not based on any specific health effects. Most regulatory agencies believe, as does staff, that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify any retrofit of existing lines.

Before the present health-based concern developed, measures to reduce field effects from power line operations were mostly aimed at the electric field component whose effects can manifest themselves as the previously noted radio noise, audible noise and nuisance shocks. The present focus is on the magnetic field because only it can penetrate the soil, building and other materials to potentially produce the types of health impacts at the root of the present concern. As one focuses on the strong magnetic fields from the more visible overhead transmission and other high-voltage power lines, staff considers it important for perspective, to note that an individual in a home could be exposed for short periods to much stronger fields while using some common household appliances (National Institute of Environmental Health Services and the U.S. Department of Energy, 1995). Scientists have not established which of these types of exposures would be more biologically meaningful in the individual. Staff notes such exposure differences only to show that high-level magnetic field exposures regularly occur in areas other than around high-voltage power lines.

## SETTING

According to information from the applicant (EAEC 2001a, page 8.4-2), the proposed EAEC and related switchyard will be located on a 55-acre lot within a 174-acre parcel in rural Alameda County. The site, which is near the borders of Contra Costa and San Joaquin counties, is within an area with many infrastructure projects, the most important of which are: Western's Tracy Substation, two pumping stations for the Delta-Mendota Canal and the California Aqueduct, a PG&E compressor station, numerous wind farms, four 500 kV lines, four 230 kV lines, and several lines of lower voltage. A listing of these area transmission lines was provided by the applicant together with information on voltage ratings and current-carrying capacities (EAEC 2001a, page 5-3).

The project site is bounded to the north by Byron Bethany Road, to the south by Kelso Road, and to the west by Mountain House Road. The low population density of this rural area should serve to minimize the residential magnetic field exposure at the root of the present health concern; the site is currently used for grazing and crop farming. The only project-related EMF exposures of potential significance are the short-term exposures to plant workers, regulatory inspectors, maintenance personnel, approved guests, or individuals in transit across the project's lines. These types of exposures are short term and well understood as not significantly related to the present health concern.

## PROJECT DESCRIPTION

The proposed EAEC lines will consist of the segments listed below:

Two new double-circuit overhead lines (on two parallel tower structures) extending the 0.5 mile distance from the proposed on-site EAEC Switchyard to the existing Tracy-Westley double-circuit 230 kV line;

The new EAEC Switchyard; and

Project-related modifications at the existing Tracy and Westley Substations.

The existing Tracy-Westley (MID/TID) line to be interconnected was built as a double-circuit line but is currently operated as a single-circuit line and will remain the same during EAEC operations. However, specific EAEC-related modifications on the line would allow for use of a double-circuit connection between the existing Tracy Substation and its project-related switchyard. Such use of a double-circuit connection is intended to improve the reliability of system operations (EAEC 2001a, page 5-13). The proposed lines will be located within a right-of-way of 380 feet.

Each of these lines will be carried on tubular steel support towers as with the existing Tracy-Westley line to which they will be connected. The basic structure of these support towers was provided by the applicant as relevant to field reduction effectiveness (EAEC 2001a, page 5-24). These towers are typically 110 ft tall and of the same design as those for the Tracy-Westley line. Details of the proposed tower placement scheme have been provided by the applicant (EAEC 2001a, pages 5-6, and 5-24). Since the proposed project lines are to be constructed and operated according to standard Western practices, they will be designed according to those aspects of these practices that minimize line electric and magnetic fields. The focus of staff's analysis is on the intensities of these new line fields and the level of their potential contribution to existing area field levels.

## IMPACTS

## GENERAL IMPACTS

GO-95, and Title 8 of the California Code of Regulations section 2700 et seq., as noted in the LORS section, ensure the minimum regulatory requirements necessary to prevent the direct or indirect contact previously discussed in connection with hazardous shocks or aviation hazards. Of secondary concern are the noted field impacts manifesting themselves as nuisance shocks, radio noise, communications interference and magnetic field exposure. The relative magnitude of such impacts would be reflected in the field strengths characteristic of a given line design. Since applied field-reducing measures can affect line operations and safety, the extent of their implementation and resulting field strengths will vary according to environmental and other local conditions bearing on line safety, efficiency, reliability and maintainability. They will, therefore, vary from one service area to the other according to prevailing conditions. It would be up to the applicant to apply such measures to the extent appropriate for the geographic area involved.

## PROJECT SPECIFIC IMPACTS

### Aviation Safety

As noted by the applicant (EAEC 2001a, page 5-18) the nearest airport to the project site is Byron Airport, approximately 2.8 nautical miles to the northeast. Given this distance and the orientation of the airport's runway, staff considers the proposed line unlikely to pose a significant obstruction hazard to utilizing aircraft according to FAA criteria. Therefore no FAA "Notice of Construction or Alteration" will be required. However, the applicant will contact the FAA about the lines, as is standard industry practice.

### Interference with Radio-Frequency Communication

The previously noted corona-related communications interference is most commonly caused by irregularities (such as nicks and scrapes on the conductor surface), sharp edges on suspension hardware, and other discontinuities around the conductor surface. The proposed lines will be built and maintained according to Western practices, minimizing such surface irregularities and discontinuities (EAEC 2001a, pages 5-10 and 5-16). Moreover, the potential for such corona-related interference is usually of concern only for lines of 345 kV and above, and not the proposed 230 kV lines (except in rainy weather when the presence of raindrops increases the strengths of the offending surface electric fields). The low-corona design for the proposed project lines would be the same as used for the existing 230 kV lines to which the lines would be connected. Since these existing lines do not currently produce the corona effects of specific concern, staff does not expect any corona-related radio-frequency interference anywhere around the proposed route. In the unlikely event of specific complaints, the applicant would be responsible for the necessary mitigation as required by the FCC. Staff recommends a specific condition of certification (**TLSN-3**) in this regard.

### Audible Noise

As happens with radio noise, the low-corona design for the proposed EAEC lines will minimize the potential for corona-related audible noise (as with Western, PG&E and other area lines). This means, as reflected in the applicant's calculations (EAEA 2001a, Appendix 5.5C), that the proposed interconnection line will not add significantly to current background noise levels in the project area. For an assessment of the noise from all phases of the proposed project and related facilities, please refer to staff's analysis in the **Noise** section.

### Fire Hazards

Standard fire prevention and suppression measures for all Western lines will be implemented for the proposed lines (EAEC 2001a, page 5-18). The applicant's intended compliance with the clearance-related aspects of GO-95 would be an important part of this compliance approach. Moreover, the route for the proposed interconnection lines will have no trees or brush as it traverses Kelso Road and the agricultural field between Kelso Road and the new project substation.

### Hazardous Shocks

The applicant's noted intention to implement the GO-95- related measures against direct contact with the energized line (EAEC 2001a, pages 5-11 and 5-16) will serve to

minimize the risk of hazardous shocks. Staff recommends condition of certification **TLSN-1** to ensure implementation of the necessary mitigation measures.

## Nuisance Shocks

The potential for nuisance shocks around the proposed lines will be minimized through standard grounding practices (EAEC 2001a, pages 5-17 and 5-18). Staff recommends condition for certification, **TLSN-2** to ensure such grounding.

## Electric and magnetic field exposure

Maximum field strengths along the routes of the proposed and existing area lines were calculated by the applicant (EAEC 2001a, pages 5-15, 5-16 and Appendix 5.5-D) to assess the potential contribution of EAEC's lines to the area's electric and magnetic field levels together with the need for additional mitigation. Staff has verified the accuracy of the applicant's calculations with regard to parameters bearing on field strength dissipation and exposure assessment. Since there will be no EAEC-related changes to system voltage or conductor configurations as previously noted, there will be no change to existing system electric fields and their noted impacts.

The maximum magnetic fields within the route of the proposed interconnecting lines was calculated as 136.5 mG at the centerline, diminishing to 30 mG at the east edge of the right-of-way and 16.5 mG at the west edge. These field strength values are at the levels that staff would expect for existing lines of the same voltage and current-carrying capacity. The maximum intensity along the route of the 230 kV project- to-Westley line was calculated to increase from 91.4 mG to 136.3 at the centerline and from 20.1 mG to 30.0 mG on both sides of the right-of-way. The maximum strengths along the route of the area's 500 kV and 230 kV PG&E lines (within a common corridor) was calculated to increase from 87.9 mG to 97.2 mG during EAEC operations. The increase at the edge of the right-of-way was calculated as slightly changing to the east edge from 57.7 mG to 58.2 mG, and from 13.3 mG to 24.5 mG at the west edge. Such field strength changes show the added power from the proposed EAEC as adding magnetic fields at levels staff expects for similar PG&E lines. These resulting field strengths are much lower than the 150 to 230 mG established for the edge of the rights-of-way by the few states with regulatory limits on these line magnetic fields.

The applicant has identified the field reduction approaches incorporated into the existing area and proposed EAEC-related line design at issue (EAEC 2001a, pages 5-16 and 5-17). These measures include the following:

1. Increasing the distance between the conductors and the ground;
2. Reducing the spacing between the conductors;
3. Minimizing the current in the line; and
4. Arranging current flow to maximize the cancellation effects from interacting fields from nearby conductors.

Since these field reducing measures have been incorporated into the proposed line design to an extent without impacts on line safety, efficiency, reliability and maintainability, staff considers further mitigation as unnecessary but recommends a

specific condition of certification (**TLSN-4**) to validate the reduction efficiency assumed by the applicant.

## CUMULATIVE IMPACTS

The reported field strengths were calculated by the applicant to factor the interactive effects of the fields from the proposed and nearby PG&E lines. Therefore, these values should be seen as representing cumulative exposures from the project's and existing area PG&E lines. As reflected in the calculated values, any such exposures would be similar to those associated with existing lines of similar voltage and current-carrying capacity.

# PUBLIC AND AGENCY COMMENTS

There were no specific public or agency comments on the issues addressed in this analysis.

# CONCLUSIONS AND RECOMMENDATIONS

## CONCLUSIONS

Since electric or magnetic field health effects have neither been established nor ruled out for overhead and underground lines, the public health significance of any EAEC-related field exposures cannot be characterized with certainty. The long-term, mostly residential magnetic exposure at the root of the present health concern will be insignificant for the proposed interconnection lines given the general absence of residences along the proposed route. On-site worker or public exposures would be short term and at levels expected for similar Western designs and current-carrying capacity. Such exposures are well understood and have not been established as posing a health hazard to humans.

The potential for nuisance shocks will be minimized through grounding and other field-reducing measures to be implemented by the applicant in keeping with current Western guidelines reflecting common industry practices. Since there are no major airports or aviation centers in the immediate project area, staff does not expect the proposed lines to pose a significant aviation hazard. The use of low-corona line design together with appropriate corona-minimizing construction practices will minimize the potential for corona noise and its related interference with radio-frequency communication anywhere in the project area.

## RECOMMENDATIONS

Since the project's interconnecting 230 kV lines will be designed to minimize the safety and nuisance impacts of specific concern to staff while routed through an area with few residences, staff does not consider further exposure-related mitigation as necessary and recommends that the line design be approved as proposed. Staff would recommend that the Energy Commission adopt the conditions of certification specified below to ensure implementation of the measures necessary to achieve the field reduction and line safety assumed by the applicant for the proposed design.

## CONDITIONS OF CERTIFICATION

By voluntarily agreeing to a joint analysis process with the Energy Commission and to any Conditions of Certification imposed by the Energy Commission for approval of the project, Western is not ceding any jurisdictional authority over federal facilities to the State of California.

**TLSN-1** The project shall be constructed for the proposed interconnection transmission lines according to the requirements of CPUC's GO-95, GO-52, Title 8, Section 2700 et seq. of the California Code of Regulations and Western EMF reduction guidelines.

**Verification:** Thirty days before starting construction of the EAEC's transmission line or related structures and facilities, the project owner shall submit to the Commission's Compliance Project Manager (CPM) a letter signed by a California registered electrical engineer affirming that the overhead section will be constructed according to the requirements of GO-95, GO 52, Title 8, Section 2700 et seq. of the California Code of Regulations, and Western's EMF-reduction guidelines. .

**TLSN-2** The project owner shall ensure that all metallic objects along the route of the overhead section are grounded according to industry standards.

**Verification:** At least 30 days before the lines are energized, the project owner shall transmit to the CPM a letter confirming compliance with this condition.

**TLSN-3** The project owner shall take reasonable steps to resolve any complaints of interference with radio or television signals from operation of the proposed lines. Should Western become owner of the transmission lines, Western will share information and reports with the CPM.

**Verification:** Any reports of line-related complaints shall be summarized along with related mitigation measures for the first five years, and provided in an annual report to the CPM.

**TLSN-4** The project owner shall engage a qualified consultant to measure the strengths of the line electric and magnetic fields from the proposed lines before and after they are energized. Measurements shall be made at representative points (on-site and along the line route) as necessary to identify the maximum field exposures possible during EAEC operations. All measurements, reports and mitigation shall be completed prior to turn over of equipment to Western and shall be completed with Westerns approval.

**Verification:** The project owner shall file copies of the pre-and post-energization measurements with the CPM within 60 days after completion of the measurements. Staff will assess the need for further mitigation from the results of such measurements.

## REFERENCES

EAEC (East Altamont Energy Center) 2001a. Application for Certification, Volumes I and II. Submitted to the California Energy Commission on March 20, 2001.

Electric Power Research Institute (EPRI) 1982. Transmission Line Reference Book: 345 kV and Above.

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